FIG. 1

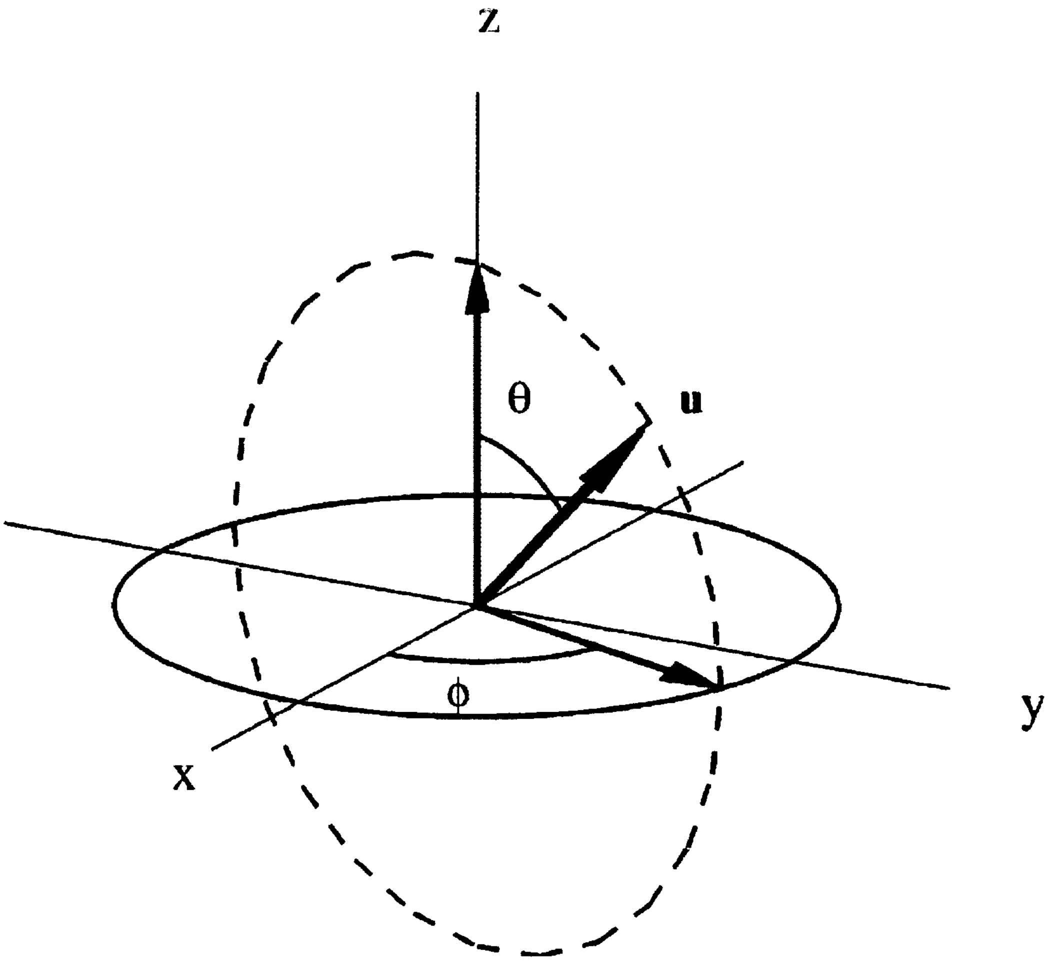


FIG. 2

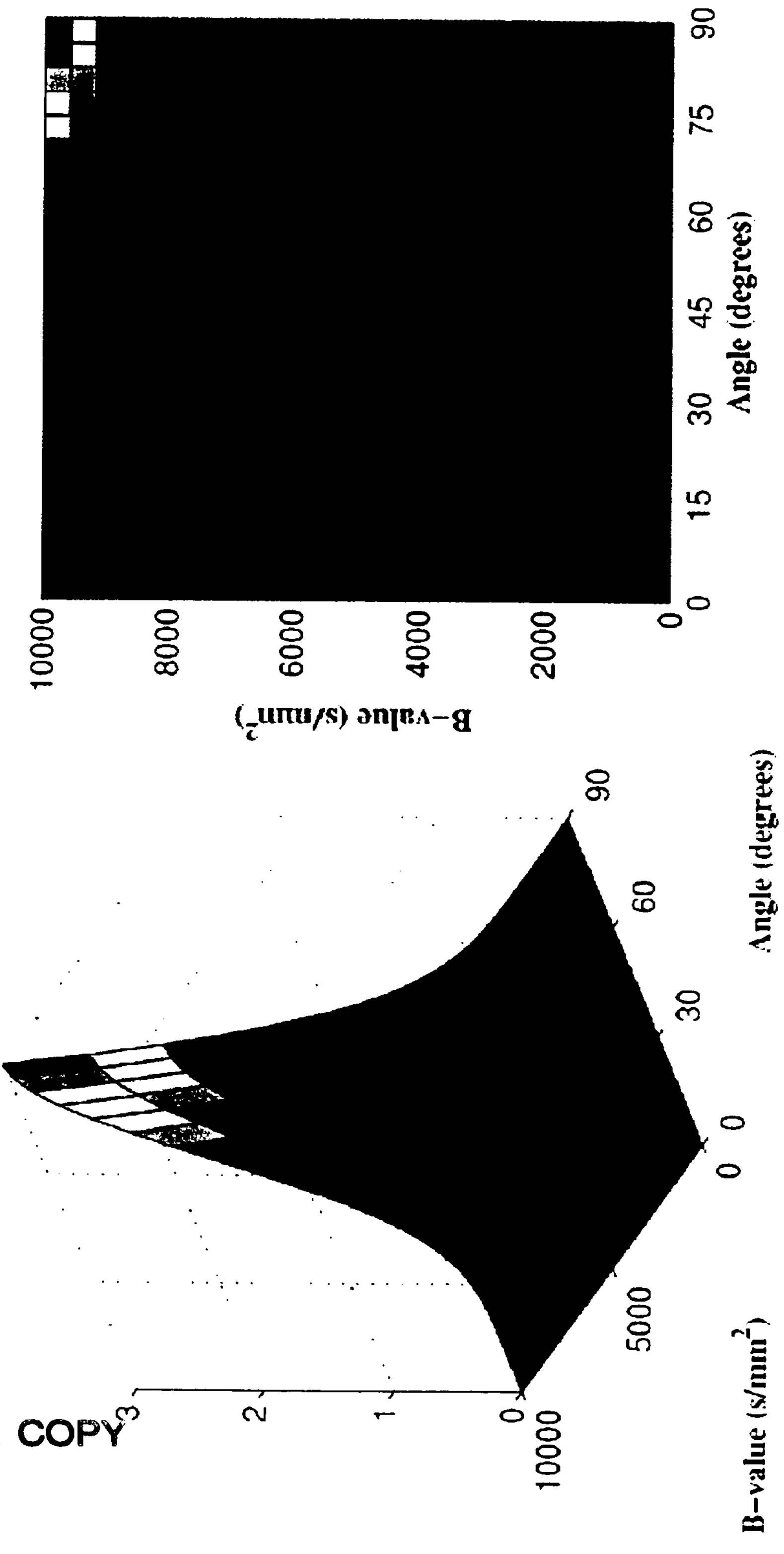
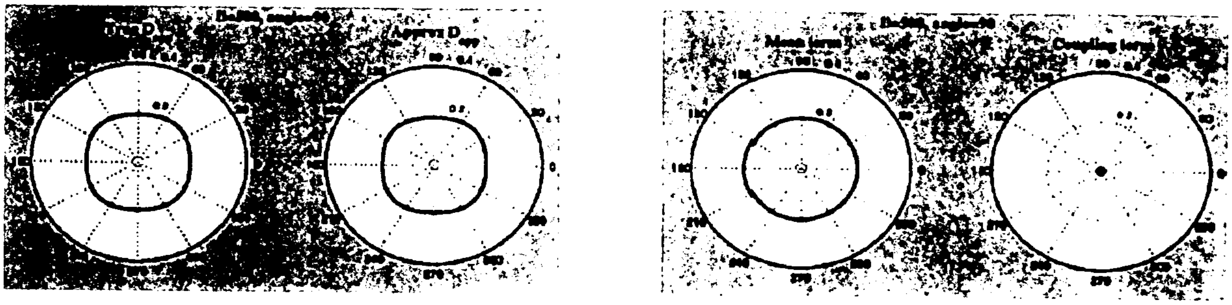
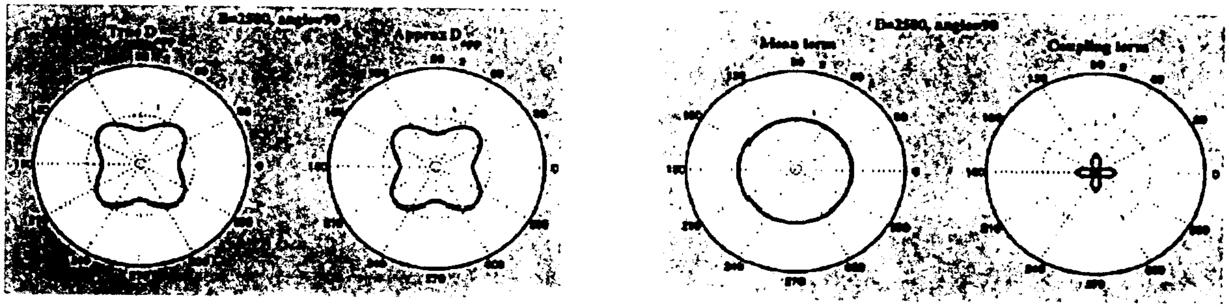

10000
8000
6000
4000
2000
0
B-value (s/mm²)
0
15
30
45
60
75
90
Angle (degrees)
3
2
1
0
10000
5000
0
0
30
60
90
B-value (s/mm²)
Angle (degrees)

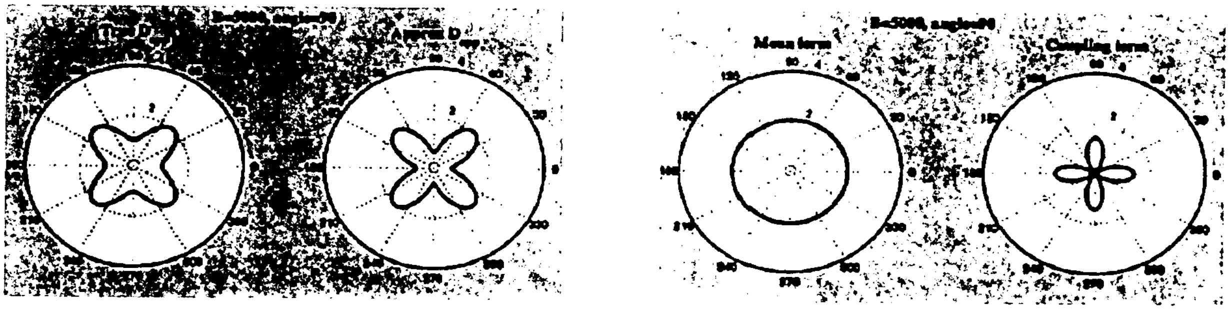
FIG. 3



$B = 500 s/mm^2$



$B = 2500 s/mm^2$



$B = 5000 s/mm^2$

FIG. 4

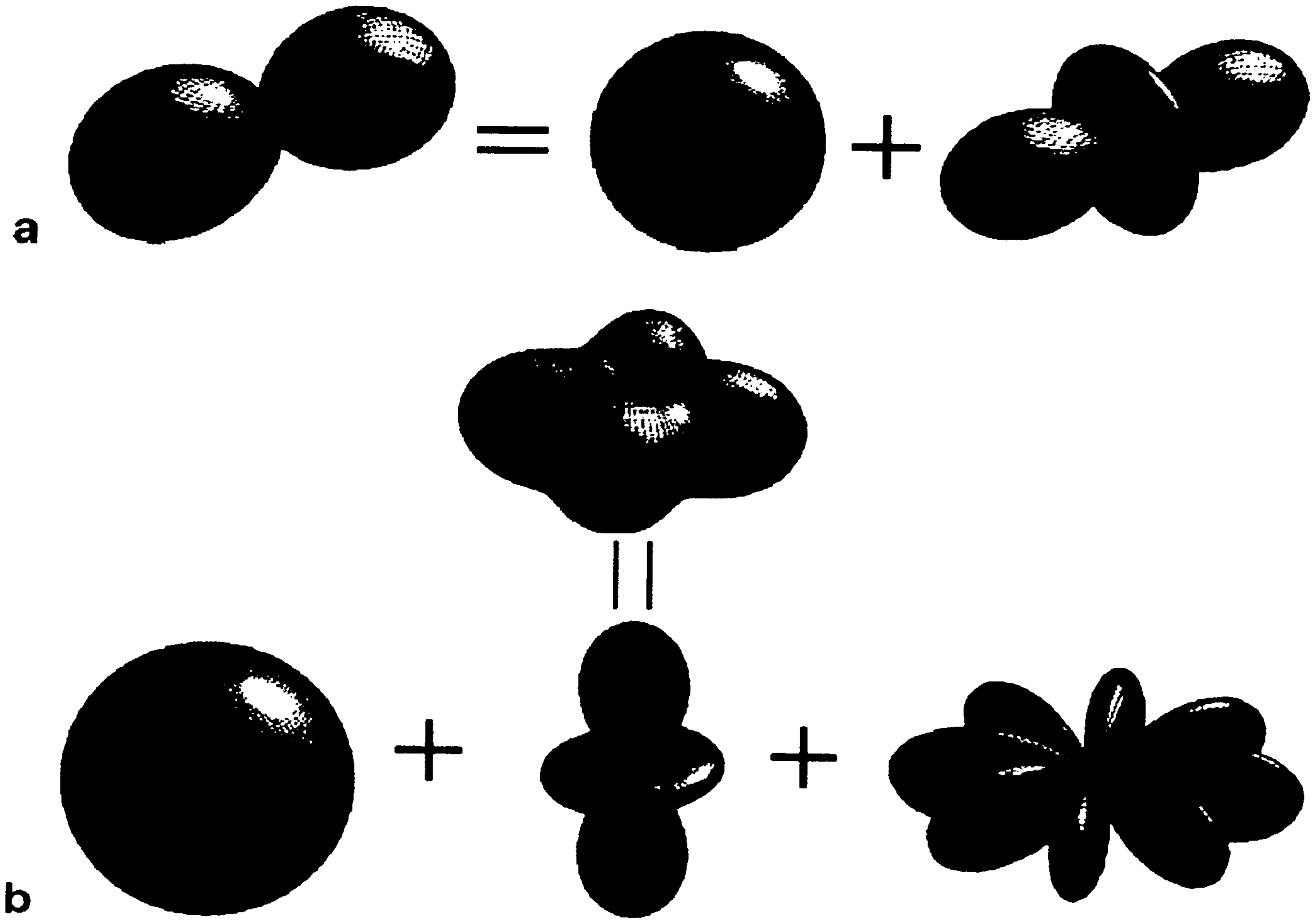


FIG. 5

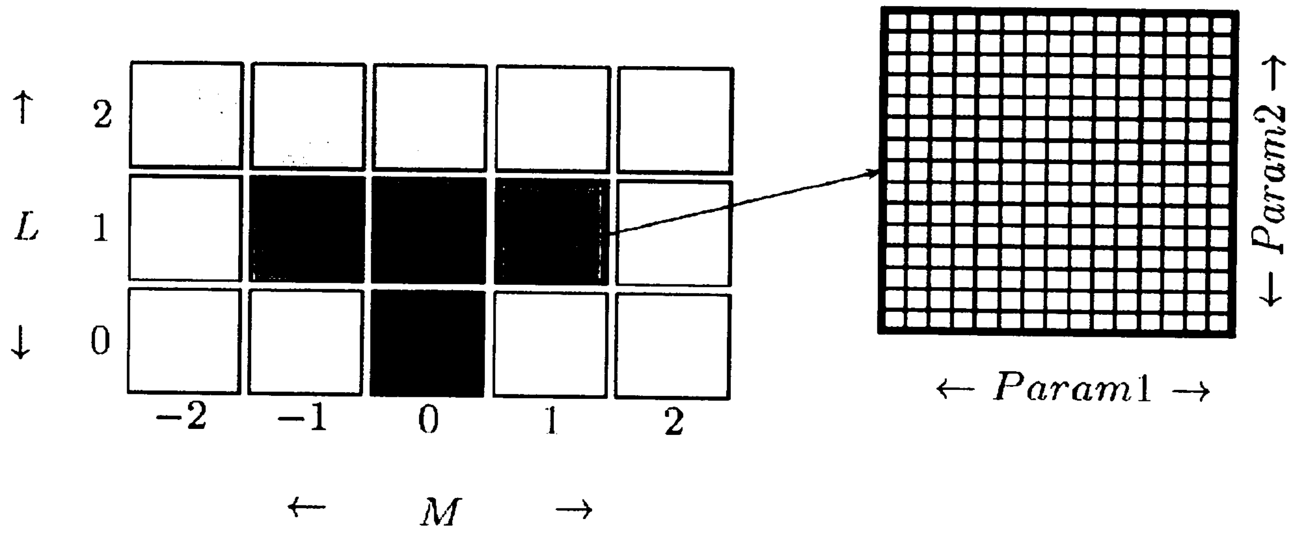

↑ 2
L 1
↓ 0
−2
−1
0
1
2
← M →
← Param2 →
← Param1 →

FIG. 6

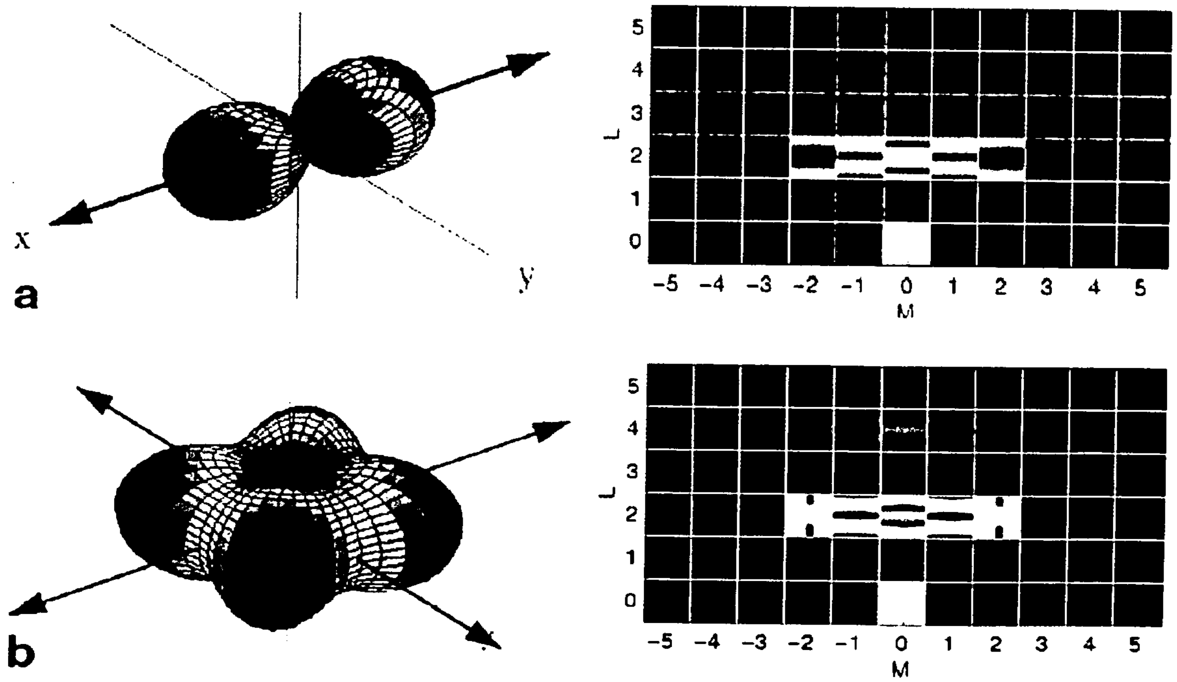

x
y
a
5
4
3
L
2
1
0
−5 −4 −3 −2 −1 0 1 2 3 4 5
M
b
5
4
3
L
2
1
0
−5 −4 −3 −2 −1 0 1 2 3 4 5
M

FIG. 7

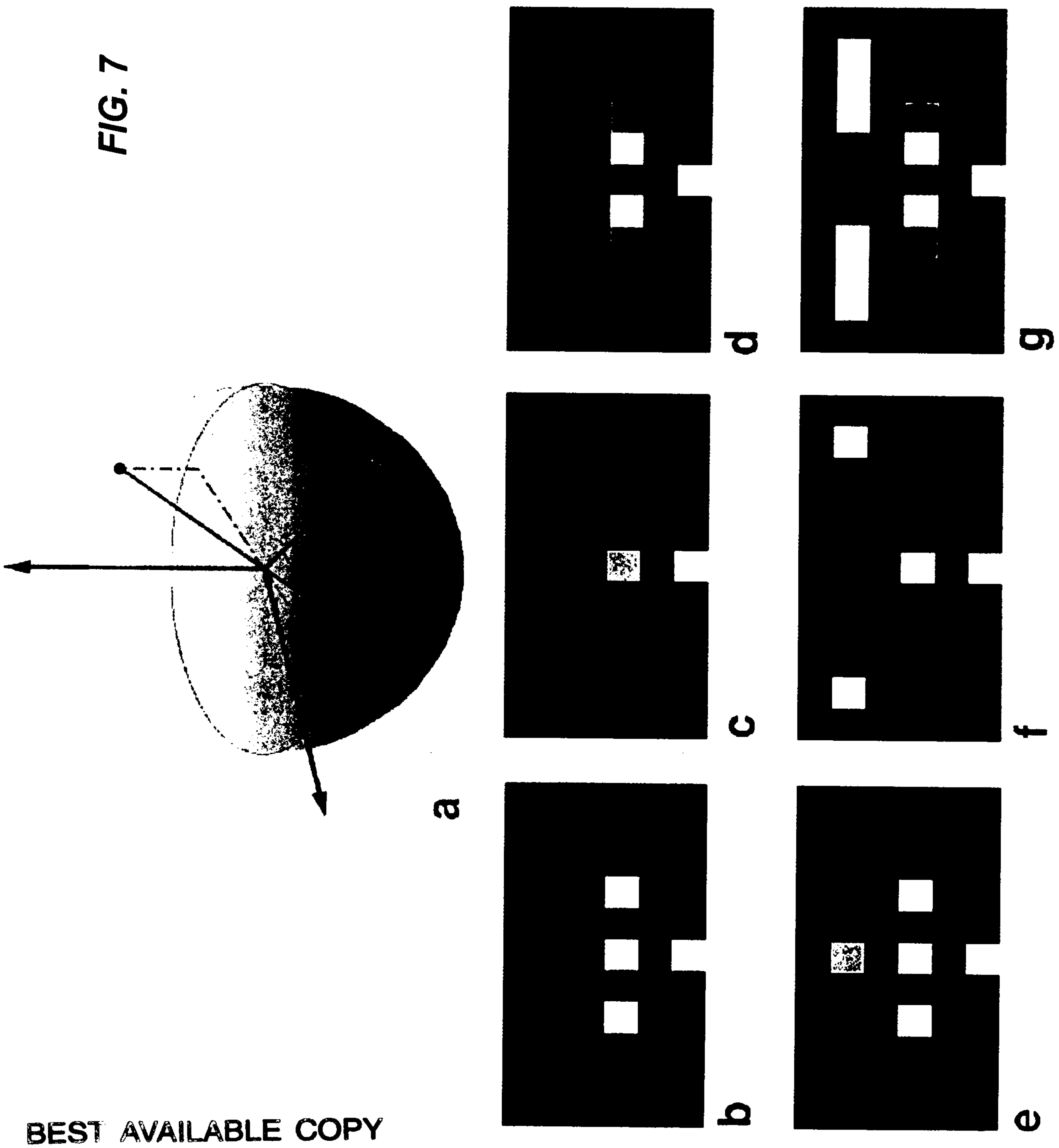


FIG. 8

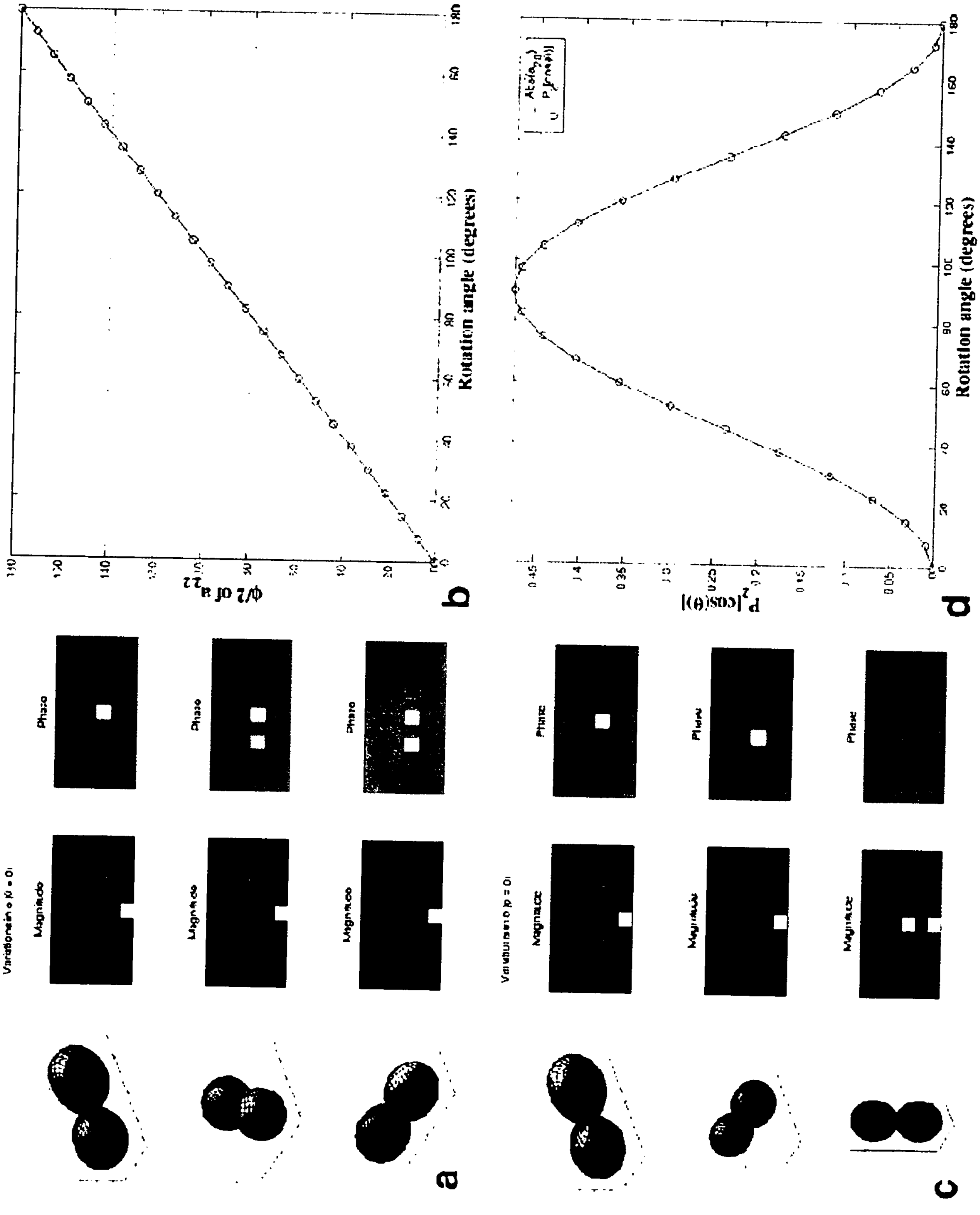

a
Magnitude
Phase
b
$\phi/2$ of a_{22}
Rotation angle (degrees)
0
20
40
60
80
100
120
140
160
180
c
Magnitude
Phase
d
$P_2^2[\cos(\theta)]$
Rotation angle (degrees)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
$Abs(a_{20})$
$P_2[\cos(\theta)]$

FIG. 9

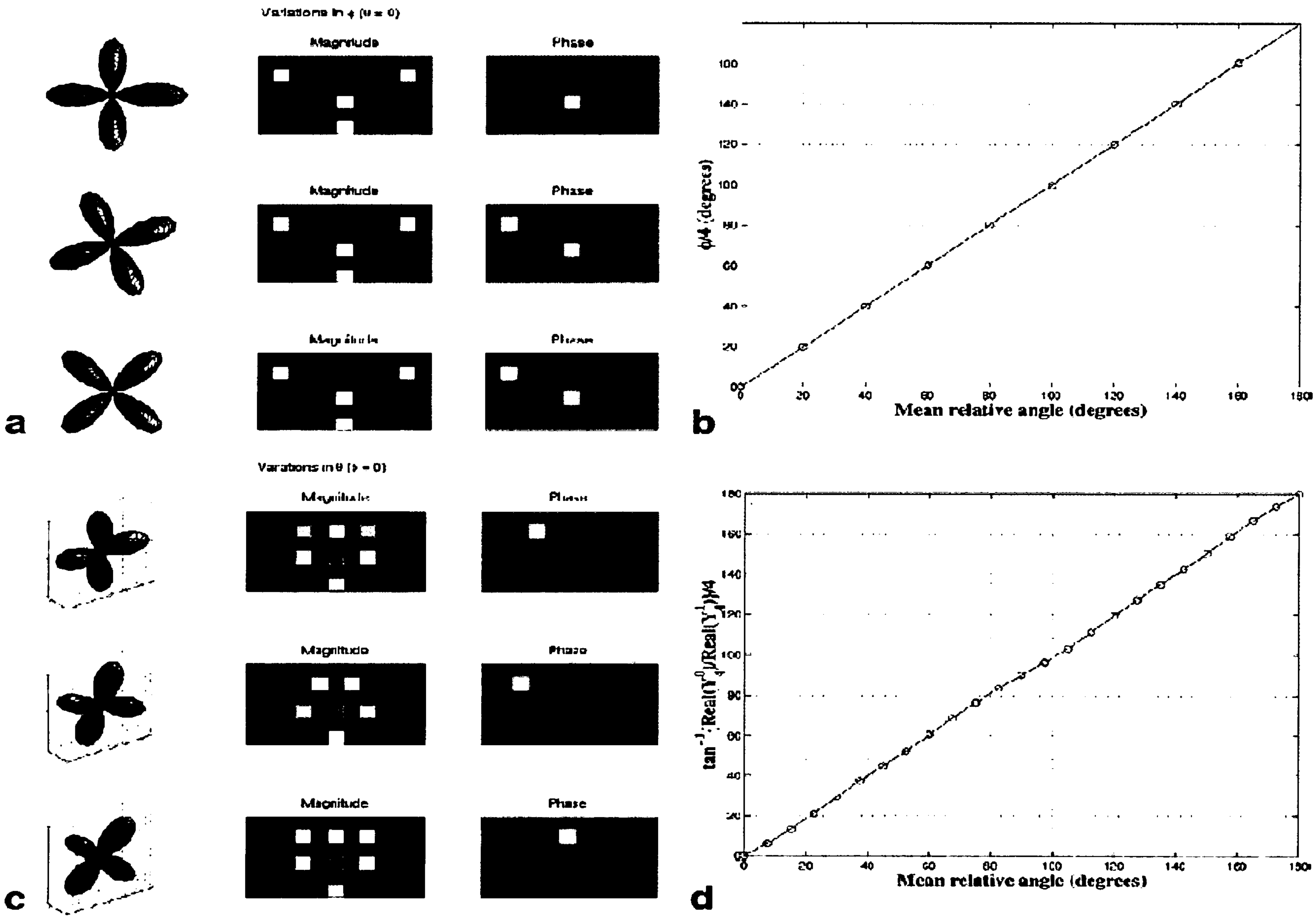
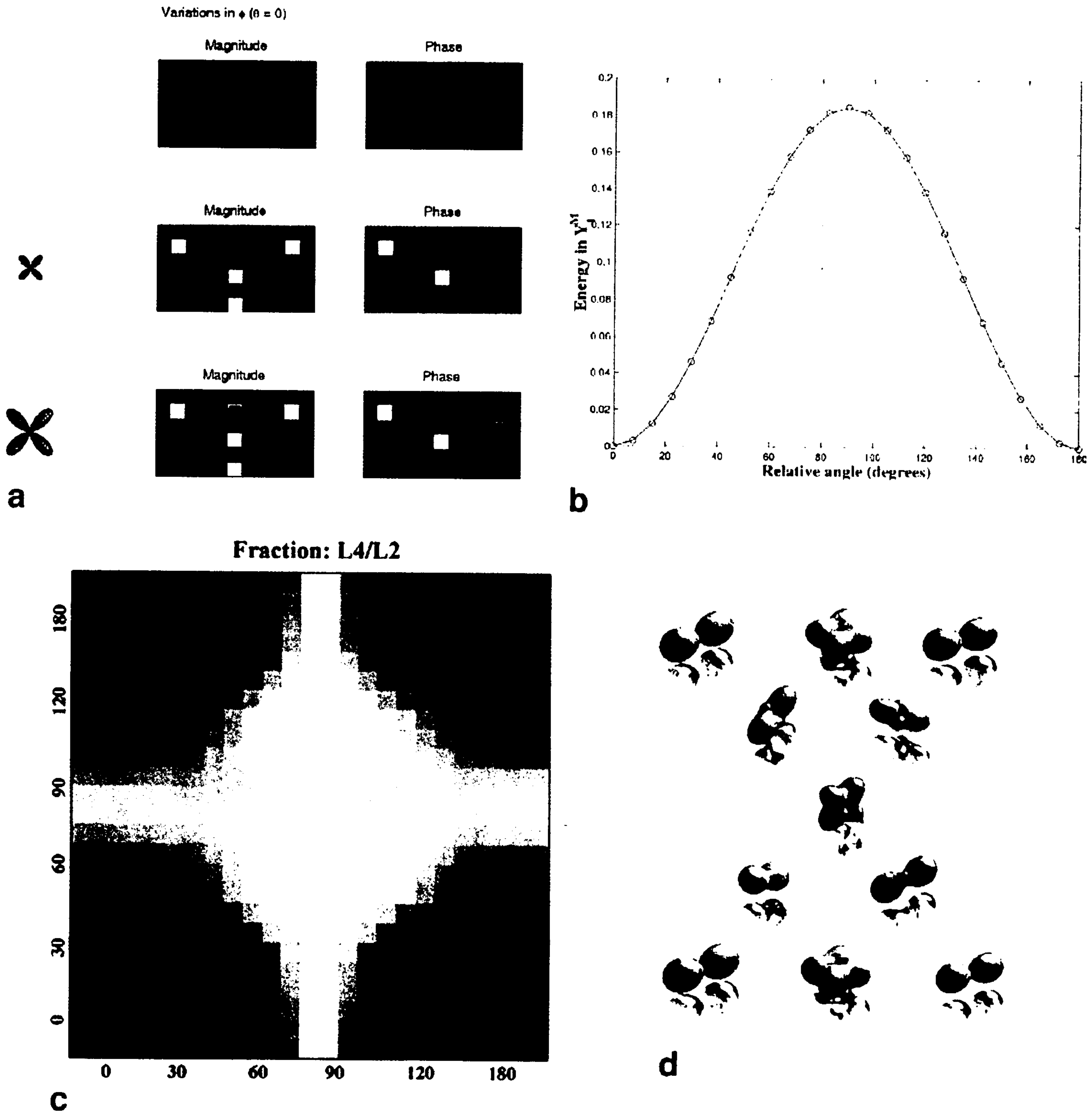

a
Variations in φ (θ = 0)
Magnitude
Phase
Magnitude
Phase
Magnitude
Phase
b
$\phi/4$ (degrees)
0
20
40
60
80
100
120
140
160
Mean relative angle (degrees)
0
20
40
60
80
100
120
140
160
180
c
Variations in θ (φ = 0)
Magnitude
Phase
Magnitude
Phase
Magnitude
Phase
d
$\tan^{-1}(\mathrm{Real}(Y_4^0)/\mathrm{Real}(Y_4^1))/4$
0
20
40
60
80
100
120
140
160
180
Mean relative angle (degrees)
0
20
40
60
80
100
120
140
160
180

FIG. 10


Variations in ϕ (θ = 0)
Magnitude
Phase
Magnitude
Phase
Magnitude
Phase
a
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Energy in Y
0
20
40
60
80
100
120
140
160
180
Relative angle (degrees)
b
Fraction: L4/L2
180
120
90
60
30
0
0
30
60
90
120
180
c
d

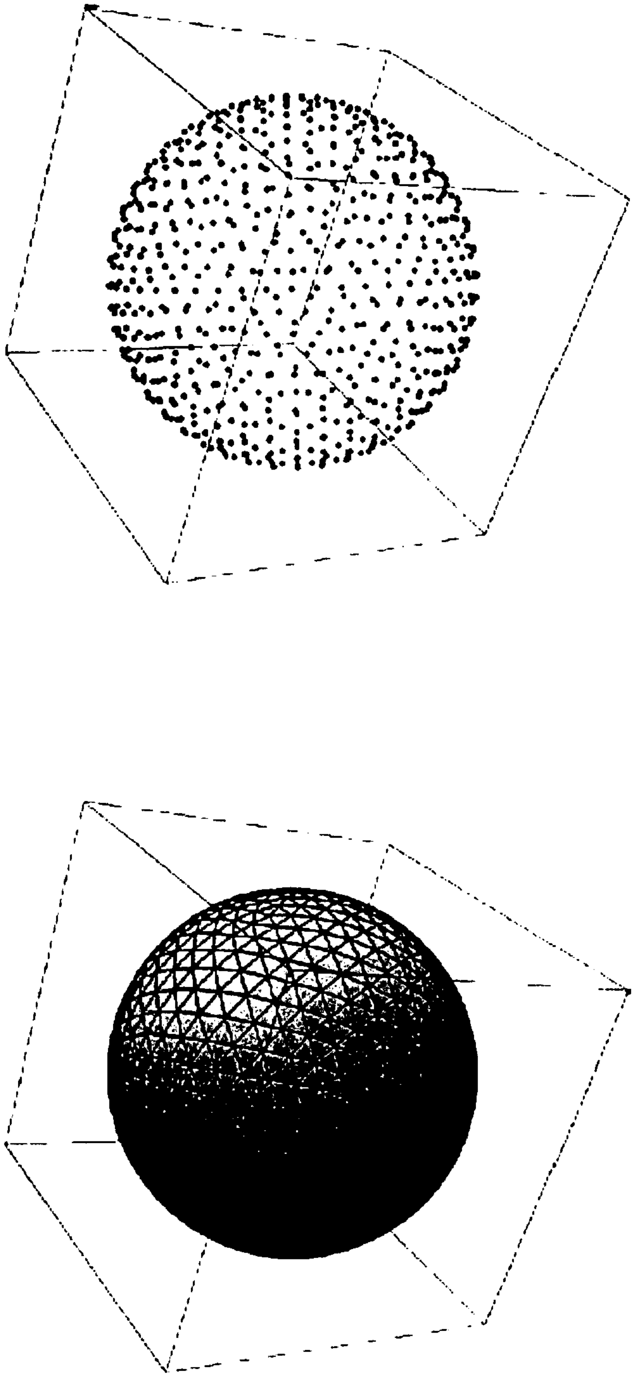
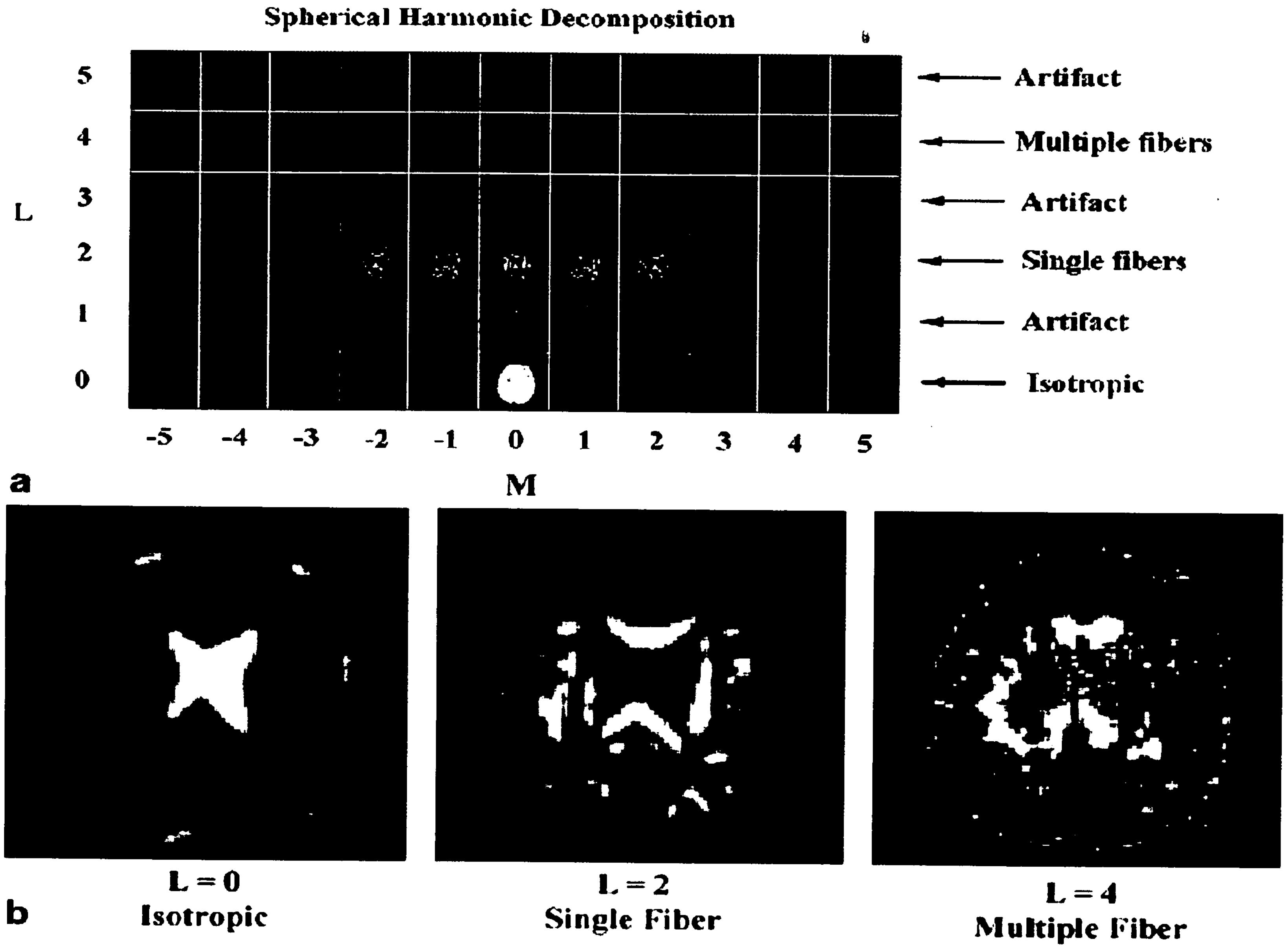


FIG. 11

FIG. 12


Spherical Harmonic Decomposition

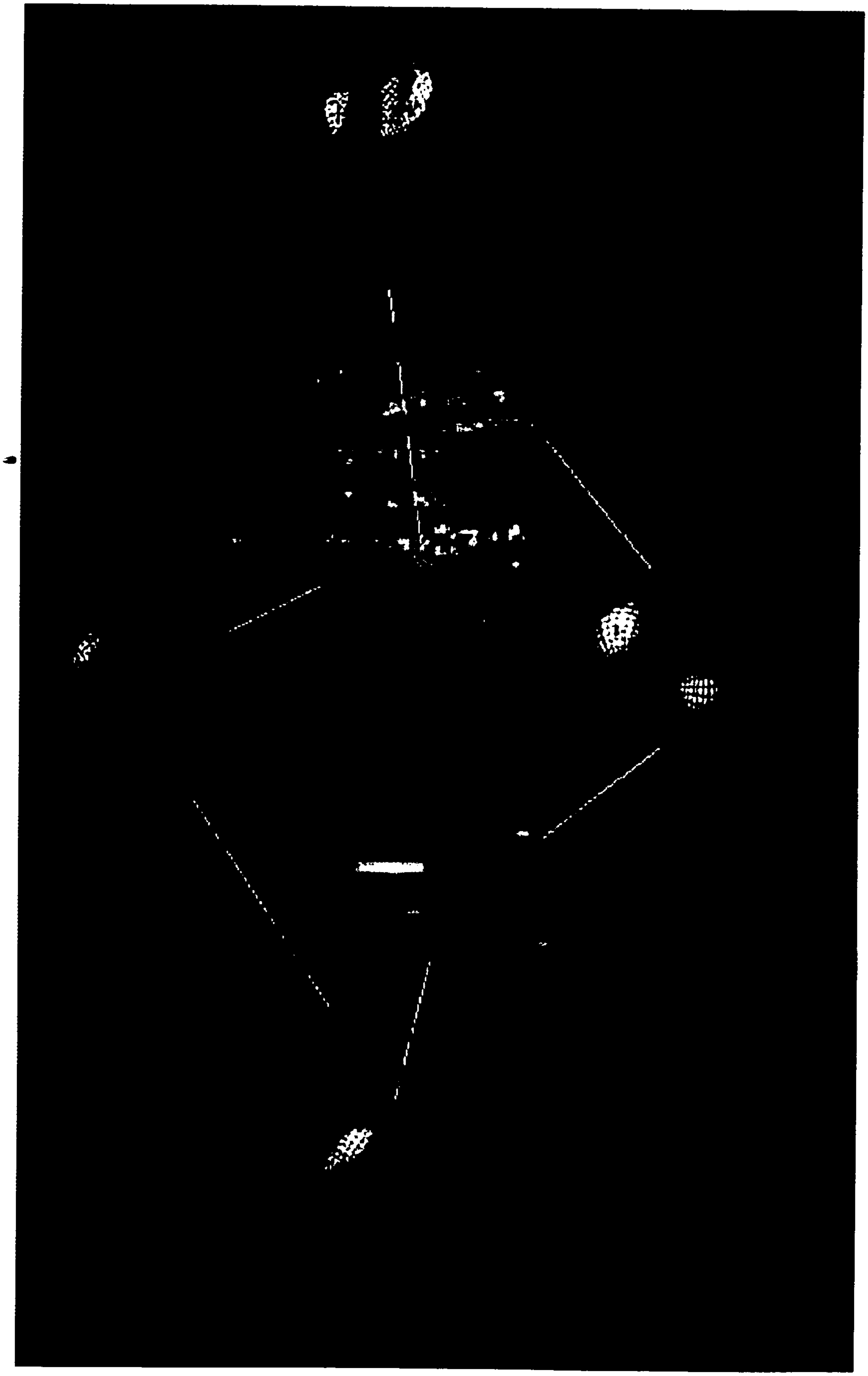
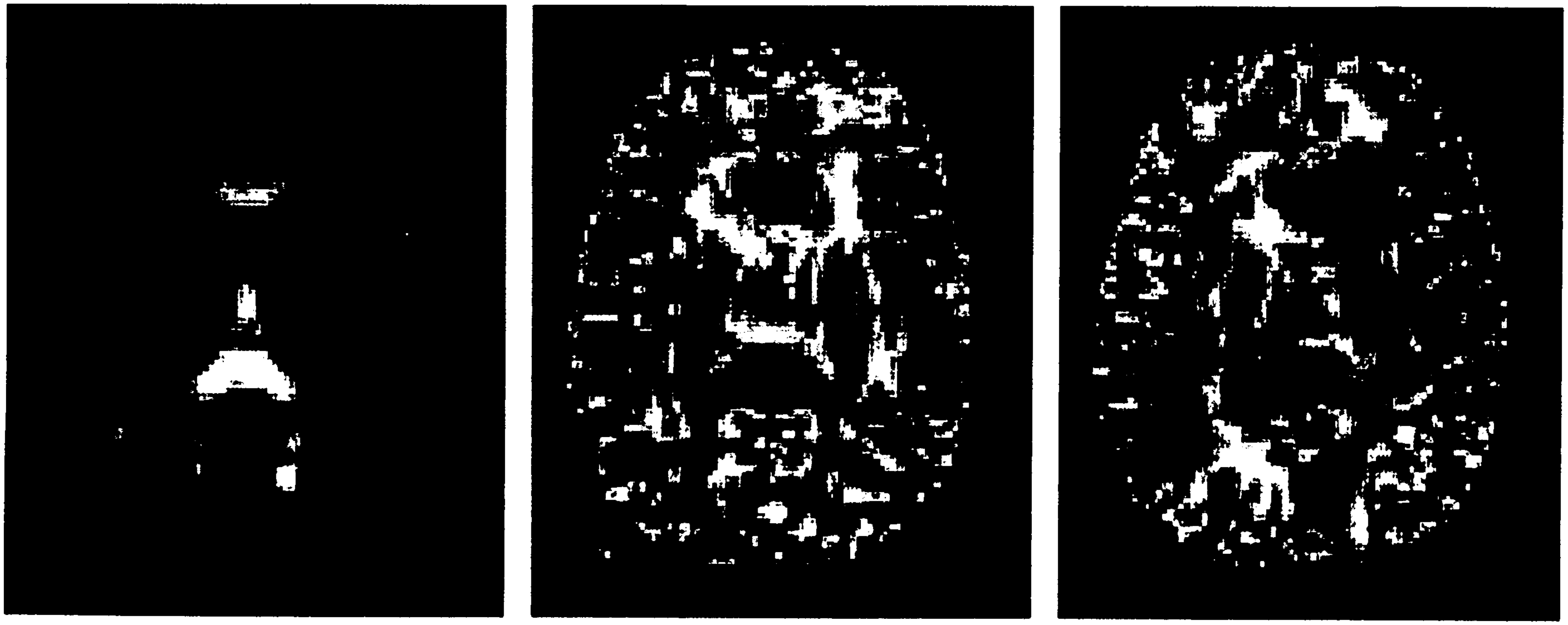


FIG. 13

FIG. 14

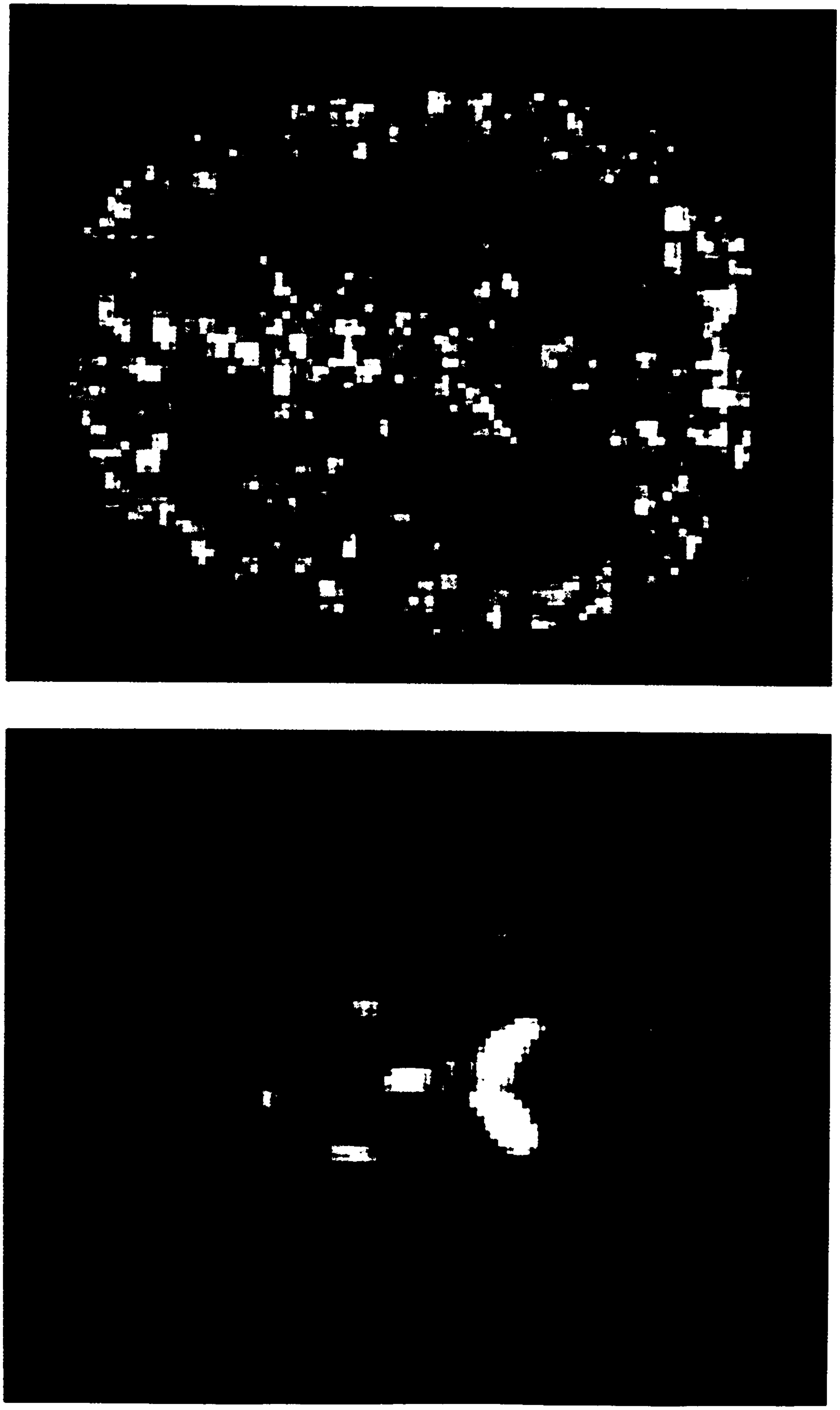


a Magnitude of $L = 2$ channel.

b Estimate $\hat{\theta}$ of polar angle.

c Estimate $\hat{\phi}$ of azimuthal angle.

FIG. 15



Odd orders

Even orders > 0

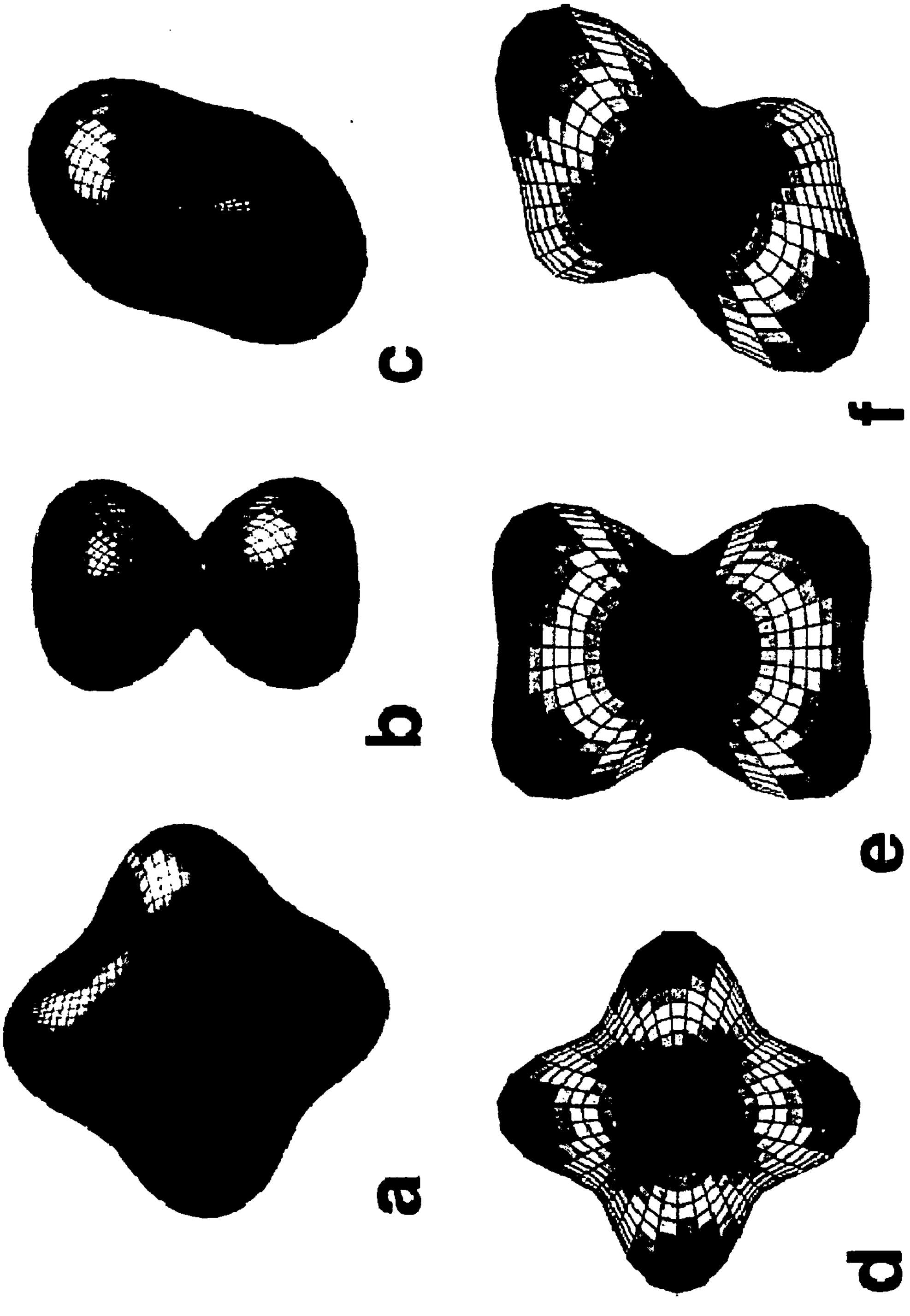
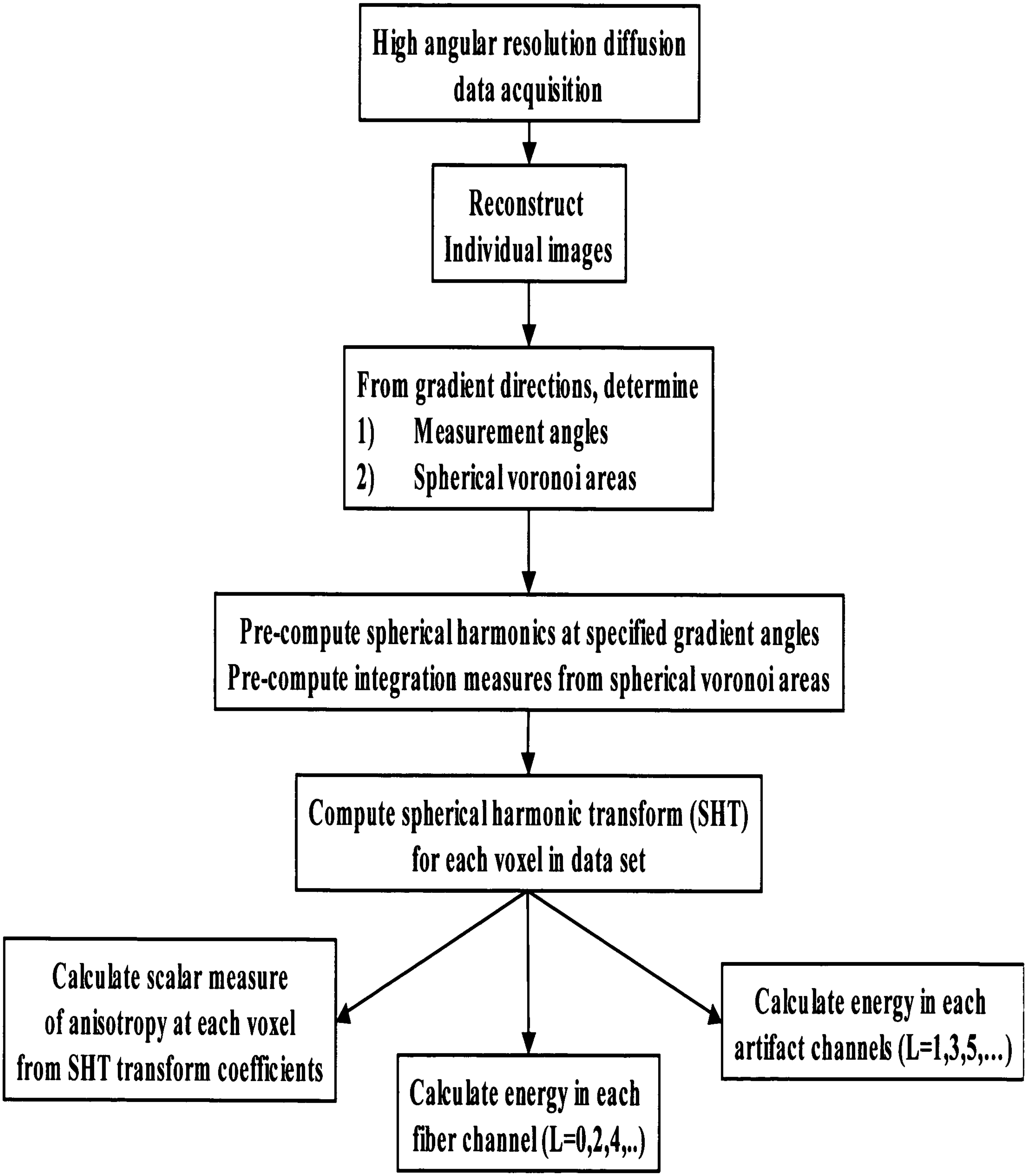


FIG. 16

FIG. 17


High angular resolution diffusion data acquisition
Reconstruct Individual images
From gradient directions, determine
1) Measurement angles
2) Spherical voronoi areas
Pre-compute spherical harmonics at specified gradient angles
Pre-compute integration measures from spherical voronoi areas
Compute spherical harmonic transform (SHT) for each voxel in data set
Calculate scalar measure of anisotropy at each voxel from SHT transform coefficients
Calculate energy in each fiber channel (L=0,2,4,..)
Calculate energy in each artifact channels (L=1,3,5,...)